DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING and COMPLIANCE DIVISION
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES)

Statement of Basis

Permittee:	City of Bozeman
Permit No.:	MT0030155
Receiving Water:	Bozeman Creek (a.k.a. Sourdough Creek)
Facility Information:	
Name	City of Bozeman Water Treatment Plant
Location	7022 Sourdough Canyon Rd., Bozeman, MT Gallatin County Latitude 45º35'58.3"N, Longitude -111º1'33"W
Facility Contact:	Rick Moroney, Water Superintendent PO Box 1230 Bozeman, MT 59771-1230 (406) 586-7158
Fee Information:	
Number of Outfalls	1
Outfall – Type	001-Process Water

I. Permit Status

This is a renewal of the Montana Pollutant Discharge Elimination System (MPDES) permit issued to the City of Bozeman (Bozeman) for their potable water treatment plant (WTP). The current permit became effective on January 1, 1996 and expired August 31, 2000. The permittee submitted a renewal application with fees on May 31, 2000. The application was deemed complete and the existing permit administratively extended by the Department on November 27, 2000.

The Montana Department of Environmental Quality (Department) requested updated information from the City of Bozeman on November 1, 2007. An updated application was received on November 27, 2007.

II. Facility Information

A. Facility Description

Bozeman's WTP is a conventional potable water treatment plant serving over 30,000 users. It is permitted through the Department's Public Water Supply program under PWSID #MT0000161 [City of Bozeman Source Water Delineation and Assessment Report, February 22, 2001 (Source Assessment)].

Bozeman uses three water supply sources: 1) Hyalite Creek (a.k.a. Middle Creek); 2) Bozeman Creek (a.k.a. Sourdough Creek); and 3) Lyman Spring. The Hyalite and Bozeman surface water sources, which are about 99% of the water supply, are treated at the Bozeman WTP via a conventional water treatment plant, including flocculation and filtration. The water is disinfected with chlorine and fluoride is added for dental hygiene purposes (Source Assessment).

Bozeman has operated water treatment at this location since 1957 (Site visit, December 4, 2008). Bozeman constructed eight filter systems in 1984 to treat up to a total of 10 million gallons per day (mgd) of potable water. Four additional filter systems were added in 1991 to allow the facility to treat up to 15 mgd. The average daily demand for potable water at present is 4 to 5 mgd, with a maximum daily demand of about 11 mgd (Source Assessment).

Water from both Hyalite and Bozeman Creek enter the facility through a vault. From the vault, the water either enters the treatment plant or overflows a weir and discharges to Bozeman Creek. The raw water to be treated may be piped to one of two flocculation tanks followed by filtering through one of eight systems installed in 1984; or one of four newer flocculation tank-filter systems that were installed in 1991.

The raw water is first treated by addition of cationic polymer (flocculant) and ferric chloride ($FeCl_3$, coagulant), by either rapid mix (for the eight older systems) or mechanical mix (for the four newer systems). After flocculation and filtration, flow-proportioned chlorine gas is added to the filtered water as it enters a 0.5 million gallon capacity clearwell. Sodium fluorisilicate and sodium hydroxide are added as the finished water is pumped from the clearwell to a storage tank reservoir for distribution through the public water supply system.

The facility's wastewater discharge is made up of chlorinated filter backwash and filter-to-waste water, which is a discharge of the filtered water for approximately three minutes while the filter settles and "cures." Approximately 35,000 – 40,000 gallons of chlorinated water is used for each backwash, which is triggered by:

- 1984 systems: timed
- 1991 systems: summer - head loss, which varies from 4 hrs – 120 hours
  winter – timed for 120 hours

The backwash wastewater flows into one of four concrete-lined settling basins, each containing approximately 0.125 million gallons, operated in parallel (combined volume of 0.5 million gallons). The permittee annually removes 50 – 150 cubic yards of settled sludge out of the lagoons and spreads it over the site (none had been disposed of off-site for over 15 years).

The wastewater overflow from each of the four basins is directed to a bentonite-lined surge pond, which has an additional 0.5 million gallon capacity. Overflow from the surge pond is gravity-fed to an effluent wet well. As a final step, Bozeman adds calcium thiosulfate to dechlorinate the wastewater in the winter as the wastewater is pumped to the discharge side of the vault. The wastewater venturi meter and sampling port are located prior to the vault. Once in the vault, the wastewater mixes with the influent overflow and is discharged into Bozeman Creek through Outfall 001.

Bozeman is allowed to reuse the effluent (Backwash Recycle Rule), but they do not. The facility's discharge design flow rate is 0.86 mgd. Based on the monthly flow records, the maximum daily flow during the period of record (POR) of January 2003 through November 2008 was 0.94 mgd (650 gallons per minute, gpm). The average flow for the POR was 0.47 mgd (325 gpm).

Bozeman is currently planning on replacing the WTP with a new membrane plant by October 2013. The pilot testing of three possible membrane filter technologies will be conducted at the facility from January to July 2009.

B. Effluent Characteristics

Table 1 summarized monthly self-monitoring effluent data for Outfall 001 for the POR of January 2003 through November 2008.

Table 1: Effluent Characteristics for the Period January 2003 through November 2008

Parameter	Location	Units	Previous Permit Limit	Minimum Value	Maximum Value	Average Value	Number of Samples
Flow, 30-Day Average	Effluent	gpm	Varies (1)	71	650	325	71
pH	Effluent	s.u.	6.0-9.0 (2)	7.0	9.0	8.0	71
Dissolved Aluminum	Effluent	mg/L	1.0 / 1.5 (3)	0.0	0.09	0.0	71
	Effluent	lbs/day	1.2	0.0	0.06	0.0	71
Chlorine, Total Residual	Effluent	mg/L	0.175	0.00	0.18	0.09	71
Total Suspended Solids (TSS)	Effluent	mg/L	30 / 45 (3)	1.0	26	6.0	71
	Effluent	lbs/day	37 (4)	1.0	144	23	71
Turbidity	Effluent	NTU	NA (5)	0.9	11	2.8	71

Footnotes:
(1) Flow limit varied by month.
(2) Instantaneous maximum.
(3) 30-Day Average / Instantaneous Maximum.
(4) Nondegradation load allocation (not effluent limit).
(5) No limit in previous permit; monitoring requirement only.

C. Compliance History

On February 29, 2008, the discharge from Outfall 001 exceeded the instantaneous maximum total residual chlorine (TRC) limit of 0.175 mg/L (discharge concentration was 0.18 mg/L). There were no other exceedences noted during the POR.

The Department conducted a compliance evaluation inspection of the WTP facility on October 18, 2007. No violations were noted during this inspection, nor during previous compliance evaluation inspections conducted on November 2, 2006, October 5, 2005, and June 21, 2001.

III. Rationale for Proposed Technology-Based Effluent Limits

A. Scope and Authority

Technology-based effluent limits (TBELs) represent the minimum level of control that must be imposed by a permit issued under the MDPES program, as stated at 40 CFR 122.44(a) and adopted by reference in Administrative Rules of Montana (ARM) 17.30.1344(2)(b). The Department must consider technology available to treat wastewater, and limits that can be consistently achieved by that technology. TBELs are based on currently available treatment technologies and allow the permittee the discretion to choose applicable controls to meet those standards.

The Montana Board of Environmental Review (BER) has adopted performance standards for point source discharges to state waters under Title 17, Chapter 30, Subchapter 12 of the ARM. Under Subchapter 12, the BER adopted by reference 40 CFR Subpart N, which is a series of federal agency rules that adopt TBELs for existing sources and performance standards for new sources [ARM 17.30.1207(1)]. In addition, ARM 17.30.635(3) states that industrial waste must receive, as a minimum, treatment equivalent to the best practicable control technology currently available (BPCTCA) as defined in Subchapter N. However, National Effluent Limit Guidelines (ELGs) have not been promulgated under Subchapter N for discharges of treated wastewater from potable water treatment plants.

The BER has also adopted general treatment requirements that establish the degree of wastewater treatment required to maintain and restore the quality of state surface waters. This rule states that in addition to federal ELGs, the degree of wastewater treatment is based on the surface water quality standards, the state's nondegradation policy, the quality and flow of the receiving water, the quantity and quality of sewage, industrial wastes and other wastes to be treated, and the presence or absence of other sources of pollution on the watershed [ARM 17.30.635(1)].

B. Proposed TBELs: Concentration-Based

The Bozeman WTP was previously permitted for TSS TBELs of:

30 mg/L – monthly average
45 mg/L – daily maximum

This is consistent with the Environmental Protection Agency (EPA) Region VII policy issued in 1977, the Science Applications International Corporation (SAIC) draft "*Model Permit Package – Water Supply Industry*," dated January 30, 1987, and the majority of the WTP permits recently renewed by the Department.

Also, the Department recognizes that treatment in WTP settling ponds is similar to treatment in domestic wastewater lagoons. Settling basins can effectively reduce TSS and turbidity from wastewater at a low cost. TSS concentrations in municipal

lagoon discharges are limited to 30 mg/L monthly average and 45 mg/L daily maximum as National Secondary Standard effluent limits [40 CFR 133.102] and these limits have been demonstrated to be consistently achievable in the water treatment industry.

The Bozeman WTP will be required to continue to meet TSS TBELs of 30 mg/L monthly average and 45 mg/L daily maximum.

C. Proposed TBELs: Mass-Based Limits

ARM 17.30.1345(8) requires that all effluent limits be expressed in terms of mass, except when applicable standards and limits are expressed in terms of other units of measurement. Calculation of any permit limit which is based on production must be based on a reasonable measure of actual production of the facility that corresponds to the appropriate time period [ARM 17.30.1345(2)(b)(i)]. Because the Bozeman WTP is not subject to an ELG or other production- or mass-based limit, the development of mass-based effluent limits is not required.

D. Nondegradation Load Allocations

The provisions of ARM 17.30.701 - 718 (Nondegradation of Water Quality) apply to new or increased sources of pollution [ARM 17.30.702(18)]. Sources that are in compliance with the conditions of their permit and do not exceed the limits established in the permit or determined from a permit issued by the Department prior to April 29, 1993 are not considered new or increased sources. In addition, activities causing nonsignificant changes in existing water quality are not considered new or increased sources.

Nondegradation load allocations for the Bozeman WTP discharge were calculated for TSS and dissolved aluminum as part of the original permit issuance in 1995, based on the average discharge flow of 0.148 mgd and the permit's proposed concentration limits for TSS and dissolved aluminum. However, the Department calculates nondegradation load allocations only for conventional pollutants, such as TSS. Dissolved aluminum is a toxic and will be subject to a concentration-based limit in the water quality section. Furthermore, the basis for the load allocations for a municipal system should be calculated on the maximum design flow rather than the average discharge flow.

The previous nondegradation load allocation for aluminum has been removed. The previous nondegradation load allocation of 37 lb/day TSS has been replaced with the following:

30-day Average:

TSS Limit (lb/day) = Daily max flow (mgd) x concentration limit (mg/L) x 8.34
Based on design daily maximum flow = 0.86 mgd

TSS daily maximum (lb/day) = 0.86 mgd x 30 mg/L x 8.34 = **215** lb/day

Daily Maximum:

TSS Limit (lb/day) = Daily max flow (mgd) x concentration limit (mg/L) x 8.34
Based on design daily maximum flow = 0.86 mgd

TSS daily maximum (lb/day) = 0.86 mgd x 45 mg/L x 8.34 = **323** lb/day

The recalculated nondegradation allocated load and the actual average loads discharged from the facility are presented below in Table 2. Actual loads for TSS were obtained from the facility DMRs. The POR is January 2003 through November 2008.

Table 2. Nondegradation and Actual Loads for POR

Nondegradation Allocated Load Limits			Actual 30-Day Average Loads					
Parameter	Units	Load	2003	2004	2005	2006	2007	2008
TSS – Monthly Ave.	lb/day	215	27.8	27.6	35.2	19.9	16.3	10.6
TSS – Daily Max (1)	lb/day	323	--	--	--	--	--	--

Notes: (1) Bozeman was previously required to monitor TSS and flow monthly; therefore, daily maximum loads are not available.

These data indicate that the facility did not exceed the nondegradation load value. Furthermore, Bozeman has not increased flow or undergone any modifications after 1993. The Bozeman WTP discharge is not a new or increased source for the purposes of nondegradation.

IV. Rationale for Proposed Water Quality-Based Effluent Limits (WQBEL)

A. Scope and Authority

Permits are required to include WQBEL when technology-based effluent limits are not adequate to protect state water quality standards (40 CFR 122.44 and ARM 17.30.1344). ARM 17.30.637(2) states that no wastes may be discharged that can reasonably be expected to violate any state water quality standards. Montana water quality standards (ARM 17.30.601-670) define both water use classifications for all state waters and numeric and narrative standards that protect those designated uses. New or increased sources, as defined in ARM 17.30.702(18), are subject to Montana Nondegradation Policy (75-5-303, MCA) and regulations (ARM 17.30.701-718).

B. Receiving Water

The receiving water, Bozeman Creek (Sourdough Creek), is classified as a B-1 at the point of discharge according to Montana Water Use Classifications, ARM 17.30.610(1)(a). Waters classified B-1 are to be maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply (ARM 17.30.623).

The discharge location is in the 10020008 4th field hydraulic unit code (HUC), as defined by the United States Geological Survey (USGS). The Montana Stream Segment is MT41H003_040.

Discharge data for the period from 1951 – 1953 for Sourdough Creek were obtained from the USGS website for site 06047500. These 883 data points were collected at a temporary gauging station located approximately 2,000 feet upstream from the intake. Peak flow was 233 cubic feet per second (cfs), with the peak occurring during May of each year. Low flow conditions were consistently in the range from 5 to 10 cfs and occur during late winter [Source Assessment]. The lowest observed flow for this period was 5.0 cfs (3.23 mgd) for two days in February 1953 [USGS].

Since a 7-day, 10-year low-flow (7Q10) is not available for Bozeman Creek, the low flow of 5.0 cfs was used as an approximate 7Q10 in the previous permit SOB. However, the USGS has seven additional data points obtained in 1987 that are lower than the data from the 1950's. The lowest observed flow was 2.1 cfs in August 1987, the second lowest was 4.6 cfs in October 1987, and the third lowest was 6.1 cfs in September 1987.

For the purposes of this permit renewal, the 7Q10 value for Bozeman will be corrected to the mean of the three lowest 1987 values, or 4.3 cfs (2.76 mgd). This results in a dilution ratio of 6:1 (based on 2.76 mgd/0.47 mgd which is the 7Q10 divided by the average daily flow of the facility).

Stream data for Bozeman creek is presented in Table 3.

Table 3. Receiving water quality data for Bozeman Creek

Parameter (mg/L unless noted)	Long Term Average	Maximum Value	Minimum Value	# Samples	Data Source
Flow, cfs	29	233	2.1	890	USGS
Temperature, deg C	7.5	11	3.0	7	USGS
TSS, mg/L	NA	7	4	2	CWAIC(2)
pH, s.u.	NA	8.17	8.09	2	CWAIC

Sources:
(1) USGS gage 06047500, 1951-1953.
(2) CWAIC = Montana Clean Water Act Information Center

Bozeman Creek in the vicinity of the discharge is listed on the 1996 and 2006 303(d) lists of impaired streams. Beneficial uses identified as partially supported on the 1996 list are aquatic life, cold water fishery, and contact recreation. Causes of impairment were identified as flow alteration, nutrients, habitat alteration, pathogens, and suspended solids. Probable sources of impairment included non-industrial permitted sources.

The 2006 303(d) list identifies the Bozeman Creek as not supporting aquatic life, and Cold Water Fisheries uses, and partially supporting Primary Contact Recreation uses. The probable causes of impairment are nutrients/total phosphorus, nutrients/total kjeldahl nitrogen, algal blooms/chlorophyll-a, pathogens/*e.coli*, sedimentation/siltration, and habitat alteration. The probable sources are grazing, irrigated crop production, habitat alteration/channelization, habitat alteration/loss of riparian habitat, unpermitted discharges/septage disposal, and urban runoff/yard maintenance.

To date, a total maximum daily load (TMDL) has not been prepared for the Bozeman Creek.

C. Mixing Zone

A mixing zone is an area where the effluent mixes with the receiving water and certain water quality standards may be exceeded [ARM 17.30.502(6)]. A mixing zone must be of the smallest practicable size, have a minimum effect on water uses, and have definable boundaries [MCA 75-5-301(4)]. Acute standards for any parameter may not be exceeded in any portion of the mixing zone unless the Department specifically finds that allowing minimal initial dilution will not threaten or impair existing beneficial uses [ARM 17.30.507(1)(b)].

The Department must determine the applicability of a mixing zone [ARM 17.30.505(1)]. A standard mixing zone may be granted for facilities which discharge a mean annual flow less than one mgd to a stream segment with a dilution less than 100:1 [ARM 17.30.516(3)(b)]. The mean average flow from Bozeman WTP is less than one mgd, and the dilution ratio with the Bozeman Creek is less than 100:1 (calculated as 6:1, based on 2.76 mgd 7Q10 stream flow/0.468 mgd annual average discharge).

In accordance with standard mixing zone procedures [ARM 17.30.516(4)], the length of a standard mixing zone must not extend downstream more than the most restrictive of:

- One-half mixing width distance; or
- Ten times the stream width.

Any previously allowed mixing zone will remain designated in a renewed permit, unless there is evidence that the previously allowed mixing zone will impair existing or anticipated uses [ARM 17.30.505(1)(c)]. The Department defined a standard mixing zone in the previous permit for Bozeman WTP. The mixing zone length was limited to 10 times the stream width, or 300 feet downsteam from the discharge point. As there is no evidence that this previously allowed mixing zone could impair existing or anticipated uses, the mixing zone will remain unchanged in this permit renewal.

Since the mean average flow from Bozeman WTP is less than one mgd, and the dilution ratio with the Bozeman Creek is less than 100:1, the discharge allocations are based on dilution with 25% of the 7Q10 [ARM 17.30.516(3)(b)]. This allocation will apply only to chronic parameters.

Compliance with acute parameters has historically been at the end-of-pipe. However, in Appendix D of the USEPA Region VIII 1994 memo "*Transmittal of Mixing Zones & Dilution Policy*," the USEPA recognized that although this policy is recommended, they will also approve mixing zone policies that allow for a zone of initial dilution on a case-by-case basis [USEPA Region VIII memo, 1994]. The

Department has determined that the maximum daily limit for TRC will be based on 1% of the 7Q10. In accordance with ARM 17.30.507(1)(b), the Department finds that allowing a limited acute mixing zone for these parameters will not threaten or impair existing beneficial uses. This finding is based on the understanding that TRC is not persistent and typically exhibits first order decay in the receiving water. The Department believes that limiting dilution to 1% of the critical receiving water flow will not result in acute lethality or block passage of migrating organisms.

D. Applicable Water Quality Standards and Proposed WQBEL/Waste Load Allocation (WLA)

Discharges to surface waters classified B-1 are subject to the specific water quality standards of ARM 17.30.623 (March 31, 2006), Department Circular DEQ-7 (February 2008), as well as the general provision of ARM 17.30.635 through 637. In addition to these standards, dischargers are also subject to ARM 17.30 Subchapter 5 (Mixing Zones, March 2006) and Subchapter 7 (Nondegradation of Water Quality, March 2006).

Pollutants typically present at potable water treatment plants that may cause or contribute to a violation of water quality standards include conventional pollutants such as TSS and pH, non-conventional pollutants such as turbidity, and toxics such as chlorine and aluminum**.**

Effluent limits are required for all pollutants which demonstrate a reasonable potential to exceed numeric or narrative standards. The Department uses a mass balance equation to determine reasonable potential based on *EPA Technical Support Document for Water Quality based Toxics Control (TSD) (EPA/505/2-90-001)* Input parameters are based on receiving water concentration, maximum projected effluent concentration and design flow of the wastewater treatment facility, and the applicable receiving water flow.

1. Conventional Pollutants

The TBEL identified in Part III is sufficient to limit TSS. No additional WQBEL will be required for this parameter. Another conventional pollutant, pH, had an effluent limit of 6.0 – 9.0 s.u. in the previous permit. This WQBEL is consistent with other permits and will not be changed.

2. Non-conventional Pollutants

Turbidity is a non-conventional pollutant of concern from the Bozeman WTP. It is unknown whether there are other non-conventional pollutants of concern, such as total dissolved solids (TDS), because monitoring data was not supplied as part of this application. This renewal will require sufficient monitoring to allow the

Department to determine whether the Bozeman WTF should have TDS limits in the next permit cycle.

The maximum allowable increase above naturally occurring turbidity in this permit is 5 nephelometric turbidity units (NTU) based on the water quality standards for Class B-1 water [ARM 17.30.623(2)(d)]. The previous permit required monthly turbidity monitoring of the effluent from the Bozeman WTP discharge. However, the proposed TSS TBELs are protective and control turbidity levels in the wastewater. No additional WQBEL are required for turbidity.

3. Toxic Pollutants

As previously stated, the Department uses a mass balance equation to determine reasonable potential based on *EPA Technical Support Document for Water Quality based Toxics Control (TSD) (EPA/505/2-90-001).* The mass balance equation to determine Reasonable Potential (RP) is listed in Equation 1.

$$C_{RP} = \frac{C_E Q_E + C_S Q_S}{Q_E + Q_S} \qquad \textbf{(Equation 1)}$$

Where:

C_{RP} = receiving water concentration after mixing, mg/L
C_E = projected maximum effluent concentration, mg/L
C_S = receiving water concentration upstream of discharge, mg/L
Q_S = applicable receiving water flow, cfs
Q_E = facility design flow rate, cfs

C_E = Maximum Observed * 1.5

If RP is found to exist in Equation 1, then the final effluent limit (EL) is calculated using the mass balance equation (Equation 2)

$$EL = \frac{C_{stnd}(Q_s + Q_e) - Q_s C_s}{Q_e} \qquad \textbf{(Equation 2)}$$

Where:

EL = calculated effluent limit, mg/L
C_{stnd} = applicable standard, mg/L
Q_s = applicable receiving water flow, cfs
Q_e = facility design flow rate, cfs
C_s = receiving water concentration upstream of discharge, mg/L

Total Residual Chlorine –

The acute water quality standard for TRC is 0.019 mg/L and the chronic water quality standard for TRC is 0.011 mg/L [DEQ-7, February 2008]. There is assumed to be no background concentration of chlorine in Bozeman Creek since there are no known sources of TRC upstream from the plant, and TRC dissipates rapidly. Therefore, the RP is equivalent to the maximum observed effluent concentration x 1.5 as shown by Equation 1. The maximum TRC concentration for the POR was 0.18 mg/L; therefore, the C_{RP} equals 0.27 mg/L and reasonable potential exists to exceed both the acute and chronic water quality standards.

The TRC concentration limit in the previous permit (as modified January 22, 1996) was 0.175 mg/L. In addition, the Bozeman WTP had specific monthly flow discharge limits ranging from 165 gpm up to 765 gpm, by month, depending upon the 7Q10 for Bozeman Creek on a given month. The combination of these two limits equated to a 0.07 mg/L TRC discharge concentration, which was determined to protect the water quality to a level below 0.011 mg/L of TRC.

The acute water quality standard for TRC is 0.019 mg/L and the chronic water quality standard for TRC is 0.011 mg/L [DEQ-7]. Attachment 1 presents the chronic and acute WLA and final effluent limits for TRC. Based on the discharge flow allocation of 1.07 cfs (25% of the 7Q10), the proposed monthly average TRC effluent limit to protect for chronic impacts is 0.016 mg/L. Based on the discharge flow allocation of 0.04 cfs (1% of the 7Q10), the proposed maximum daily TRC limit to protect for acute impacts is 0.021 mg/L. Section IV.C. provides a discussion on the development of the 1% mixing zone allocation.

Analytical methods in 40 CFR Part 136 requires chlorine samples to be analyzed immediately. On-site sampling for TRC with a chlorine meter using an approved method is required. The method must obtain a minimum detection level of 0.10 mg/L. Analytical results of less than 0.10 mg/L will be considered to be in compliance with the limits.

Dissolved Aluminum – Dissolved aluminum is a toxic parameter, and limits on it are applicable to surface waters with a pH between 6.5 and 9.0 s.u.

In the previous permit, the dissolved aluminum concentration maximum (acute) limit was 1.5 mg/L and the average (chronic) limit was 1.0 mg/L, based on Best Practicable Control Technology (BPCT). Since then, the state has implemented water quality standards for dissolved aluminum: the acute water quality standard is 0.75 mg/L and the chronic water quality standard is 0.087 mg/L [DEQ-7, February 2008].

The current treatment process at the Bozeman WTP does not demonstrate RP for dissolved aluminum, based both on knowledge of the process (Bozeman uses $FeCl_2$ rather than aluminum sulfate [$Al_2(SO_4)_3$] or other aluminum-based coagulants) as well as the dissolved aluminum monitoring results which yielded non-detect results (0.0 mg/L) for 70 out of the 71 reporting months during the POR.

It is unknown whether there is RP for iron since the facility has not conducted effluent monitoring for this parameter. The chronic water quality standard for iron is 1,000 mg/L [DEQ-7, February 2008].

The one month with a dissolved aluminum concentration "hit" (January 2008) had a result of 0.09 mg/L. Since the results from the one month were an anomaly, the Department does not feel this justifies a requirement to monitor for dissolved aluminum at this time.

However, Bozeman is currently piloting three different membrane technologies. One technology includes the use of polyaluminum chloride as a coagulant. As long as there is aluminum used as part of the water treatment process, even as part of a pilot project, then RP exists and dissolved aluminum effluent limits will need to be developed. Unfortunately, there is no dissolved aluminum data available for Bozeman Creek and the Department cannot develop an effluent limit using Equation 2 without data from the stream.

Therefore, the Department has determined that as long as aluminum or aluminum compounds are used in the facility during the upcoming permit cycle, both upstream and effluent monitoring for dissolved aluminum will be required for the duration of the aluminum use. The data from this monitoring will provide the basis for developing acute and chronic effluent limits for dissolved aluminum in the next permit. Meanwhile, the existing limits of 1.5 mg/L (acute) and 1.0 mg/L (30-day average) will remain the limits at the end of the pipe.

V. Effluent Limits

A. Interim Effluent Limits for Outfall 001

Interim effluent limits for Outfall 001 in Table 4 are effective from the effective date of the permit through May 31, 2010, after which time the final effluent limits in Table 5 apply.

Table 4: Interim Effluent Limits for Outfall 001 (through May 31, 2010)

Parameter[1]	Units	Sampling Location	Average Monthly Limit	Maximum Daily Limit
TSS	mg/L	Effluent	30	45
TRC	mg/L	Effluent	0.07	0.175
Dissolved Aluminum[2,3]	mg/L	Effluent	1.0	1.5

Footnotes:

1. See Definition section at end of permit for explanation of terms.
2. Monitoring for aluminum will be required during any time that aluminum is used in the facility.
3. Upstream monitoring for aluminum will also be required in order to provide data for developing the aluminum chronic limit in the next permit cycle, if necessary.

Effluent pH shall remain between 6.0 and 9.0. For compliance purposes, any single analysis and/or measurement beyond this limit shall be considered a violation of the conditions of this permit.

B. Final Effluent Limits for Outfall 001

Final effluent limits for Outfall 001 in Table 5 are effective from June 1, 2010 through the end of the permit term.

Table 5: Proposed Final Effluent Limits (June 1, 2010 until end of Permit Term)

Parameter[1]	Units	Sampling Location	Average Monthly Limit	Maximum Daily Limit
TSS	mg/L	Effluent	30	45
TRC	mg/L	Effluent	0.016	0.021
Dissolved Aluminum[2,3]	mg/L	Effluent	1.0	1.5

Footnotes:

1. See Definition section at end of permit for explanation of terms.
2. Monitoring for aluminum will be required during any time that aluminum is used in the facility.
3. Upstream monitoring for aluminum will also be required in order to provide data for developing the aluminum chronic limit in the next permit cycle, if necessary.

Effluent pH shall remain between 6.0 and 9.0. For compliance purposes, any single analysis and/or measurement beyond this limit shall be considered a violation of the conditions of this permit.

VI. Monitoring Requirements

A. Monitoring of the effluent must be representative of the discharge. The effluent sample must be obtained before the wastewater enters the Bozeman Creek. The facility will obtain the samples from the sampling location inside the plant immediately prior to the discharge's entrance into the vault (prior to mixing with any overflow).

Table 6 presents the proposed monitoring required for the effluent.

Table 6: Proposed Monitoring Requirements

Parameter	Unit	Monitoring Location	Frequency of Analyses	Sample Type
Flow	mgd	Effluent	Continuous	Instantaneous
TSS	mg/L	Effluent	1/Week	Grab
	lbs/day	Effluent	1/Month	Calculated
Dissolved Aluminum[1]	mg/L	Effluent	1/Week	Grab
TRC	mg/L	Effluent	1/Day	Grab
pH	s.u.	Effluent	1/Week	Instantaneous
TDS	mg/L	Effluent	1/Quarter[2]	Grab

Footnote:
(1) Monitoring for aluminum is required only during times that Bozeman WTP uses raw materials containing aluminum and/or aluminum compounds.
(2) Quarterly Samples for TDS required during calendar years 2010, 2011, and 2012 of this permit cycle, only.

B. Additional Monitoring Requirements

In addition to the effluent monitoring required in VI.A. (above), the permittee shall conduct quarterly monitoring of aluminum levels in the Bozeman Creek, upstream from the discharge point. This additional monitoring shall only be necessary once the facility determines that there will be on-going use of aluminum (after the completion of the pilot testing is complete). If the facility determines that they will not be using aluminum no effluent or upstream sampling of aluminum will be required.

The upstream monitoring information will provide the receiving water data required to complete Equations 1 and 2 to determine RP and effluent limits for aluminum.

Table 7: Proposed Upstream Monitoring Requirements

Parameter	Unit	Frequency of Analyses	Sample Type
Dissolved Aluminum	mg/L	1/Quarter(1)	Grab
Footnote: (1) Quarterly Samples required during three calendar years following decision to bring Aluminum into the facility.			

VII. Special Conditions/Compliance Schedules

ARM 17.30.1342(8) requires that the permittee furnish to the Department, within a reasonable time, any information to determine compliance with this permit. ARM 17.30.1342(10) requires that samples and measurements must be representative of the monitored activity. In addition, 75-5-602, MCA provides that the Department may require the owner/operator of any point source to install, use and maintain monitoring equipment, and to provide this information as may be reasonably required by the Department. The following conditions must be met within the given timeframe:

A. Presence of aluminum at the facility -

1. As of July 1, 2009, submit to the Department, in writing:
   - an evaluation of whether any materials currently in the facility may contain aluminum or aluminum compounds (and if so, a description of what type of material and how much); and
   - the schedule for Bozeman's selection of the future water treatment technology.

2. Within one month of selecting the future water treatment technology, but no later than December 31, 2009, inform the Department, in writing, of which technology is expected to be installed and whether or not it will include aluminum or aluminum compounds. If aluminum will be present, inform the Department of your schedule for conducting upstream monitoring, as required by this permit.

B. Emergency Response Planning -

The Bozeman WTP has identified a possible emergency scenario that could potentially result in the introduction of contaminants (oil, gasoline, or other fluids) into the water treatment system. This situation could arise if a vehicle slides off the forest service road into Hyalite Creek upstream from the water supply intake. Since Bozeman does not have chemical treatment capability, the WTP would be forced to release such contaminated water into Bozeman Creek.

As part of this permit renewal, Bozeman is required to:

1. Develop emergency procedures to respond to an accidental intake of contaminants and submit them to the Department by December 31, 2009; and

2. Develop reporting procedures, including those specified under ARM 17.30.1342(12)(f), 30.1342(13), 30.1342(14), and 30.1342(15), in the case that an emergency release is required. Include the reporting procedures in the submittal due by December 31, 2009.

VIII. Other Information

On September 21, 2000, a US District Judge issued an order stating that until all necessary total maximum daily loads (TMDLs) under Section 303(d) of the Clean Water Act are established for a particular water quality limited segment, the State is not to issue any new permits or increase permitted discharges under the MPDES program. The order was issued under the lawsuit Friends of the Wild Swan vs. US EPA et al, CV 97-35-M-DWM, District of Montana, Missoula Division.

The renewal of this permit does not conflict with Judge Molloy's order because the permitted discharge does not represent a new or increased source of pollutants under the MPDES program.

IX. Information Sources

Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. §§ 1251-1387, October 18, 1972, as amended 1973-1983, 1987, 1988, 1990-1992, 1994, 1995 and 1996.

US Code of Federal Regulations, 40 CFR Parts 122-125, 130-133, & 136.

Montana Code Annotated (MCA), Title 75-5-101 *et seq*., "Montana Water Quality Act". 2003.

Administrative Rules of Montana Title 17 Chapter 30 - Water Quality
Subchapter 2 - Water Quality Permit and Application Fees, December 2006.
Subchapter 5 - Mixing Zones in Surface and Ground Water, March, 2006.
Subchapter 6 - Montana Surface Water Quality Standards and Procedures, March 2006.
Subchapter 7- Nondegradation of Water Quality, March 2006.
Subchapter 12 - Montana Pollutant Discharge Elimination System (MPDES) Standards, March 2007.
Subchapter 13 - MPDES Permits, March 2006.

Montana Department of Environmental Quality Circular DEQ-7, Montana Numeric Water Quality Standards, February 2008

MPDES Permit Number MT0030155:
Administrative Record.
Renewal Application EPA Forms 1 and 2A, 2004.

Bozeman Public Water System Source Water Delineation and Assessment Report February 22, 2001

2006 Integrated 303(d)/305(b) Water Quality Report for Montana December 2006

US Department of the Interior Geological Survey, Statistical Summaries of Streamflow in Montana and Adjacent Areas, Water Years 1900 through 2002, Scientific Investigations Report 2004-5266, 2004.

US EPA Technical Support Document for Water Quality-Based Toxics Control, EPA/505/2-30-001, March 1991.

US EPA NPDES Permit Writers' Manual, EPA 833-B-96-003, December 1996.

Washington State NPDES General Permit for Water Treatment Plants –Fact Sheet, June 16, 2004.

US EPA Region VII Policy, "*BPT Water Treatment Plants*," From Ronald D. McCutcheon, February 24, 1977.

Federal Register notice dated November 15, 2000 (Volume 65, Number 221)

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Date: January 2009

Figure 1: Flow diagram for water treatment plant.